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WO 00/51293 A WO 00/28403 A
"THE BLUETOOTH RADIO SYSTEM" HAARTSEN, J.C
IEEE PERSONAL COMMUNICATIONS, VOLUME 7
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(54) Abstract Title
A short range radio transceiver device

(57) A short range radio transceiver device such as a Bluetooth (R.T.M) or 802.11b enabled laptop computer may automatically determine its logical location or have it set by a user. The locations may include the subscribers home, office, airport, hotel, meeting or a private location. Setting of the logical location automatically leads to appropriate parameters being set for some or all of the devices functions. The functions may include power level; notifications, enquiry, file transfer, associations, security and whether a user should be notified by a sound alert. In an alternative embodiment, the short range radio device may store information required to establish connections such as a remote device address, and information needed to use services offered by the remote device such as the names or identifier of the service.

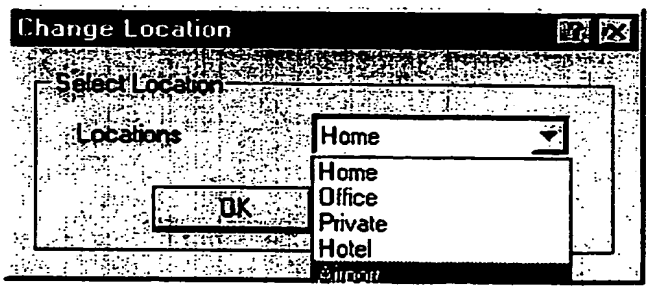

Figure 3

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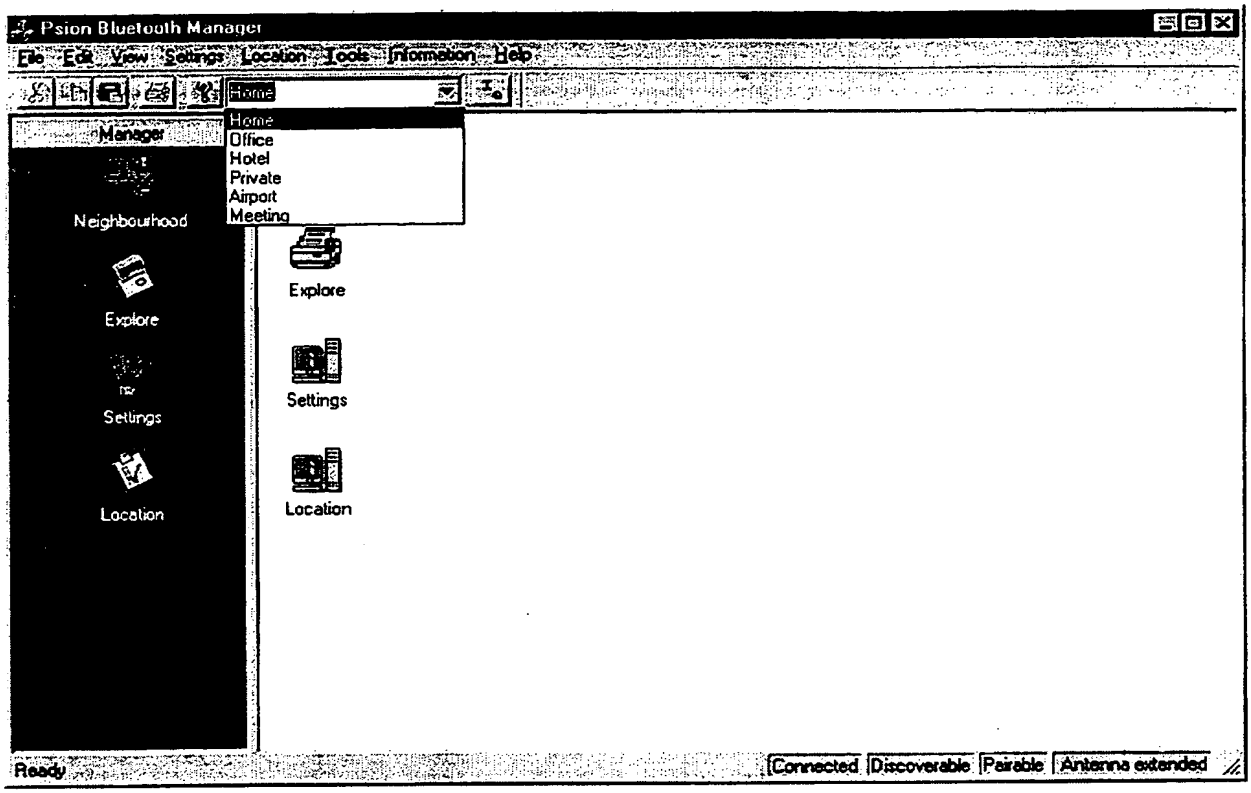
Psion Bluetooth Manager
File Edit View Settings Location Tools Information Help
Home
Manager
Home
Office
Hotel
Private
Airport
Meeting
Neighbourhood
Explore
Settings
Location
Explore
Settings
Location
Ready
Connected
Discoverable
Pairable
Antenna extended

Figure 1

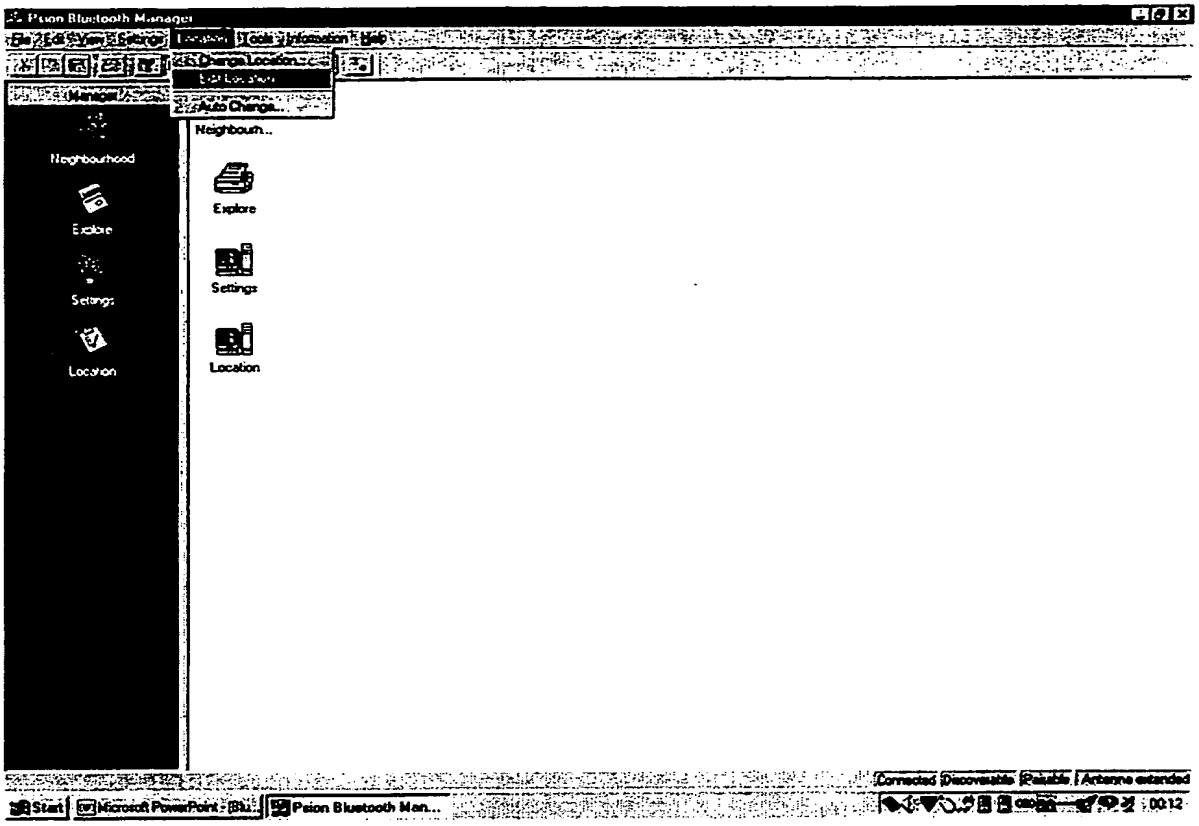
Psion Bluetooth Manager
Location
Tools
Information
Help
Change Location...
Edit Location...
Auto Change...
Manager
Neighbourhood
Explore
Settings
Location
Neighbourh...
Explore
Settings
Location
Connected
Discoverable
Pairable
Antenna extended
Start
Microsoft PowerPoint - [Bl...
Psion Bluetooth Man...
00:12

Figure 2

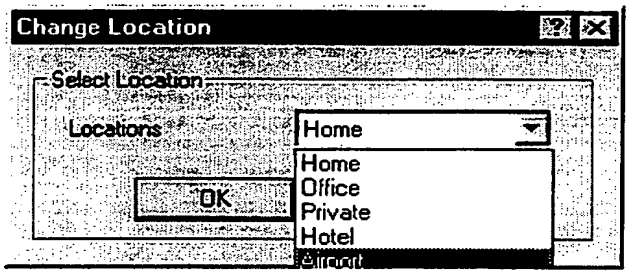
Change Location
Select Location
Locations
Home
Home
Office
Private
Hotel
OK

Figure 3

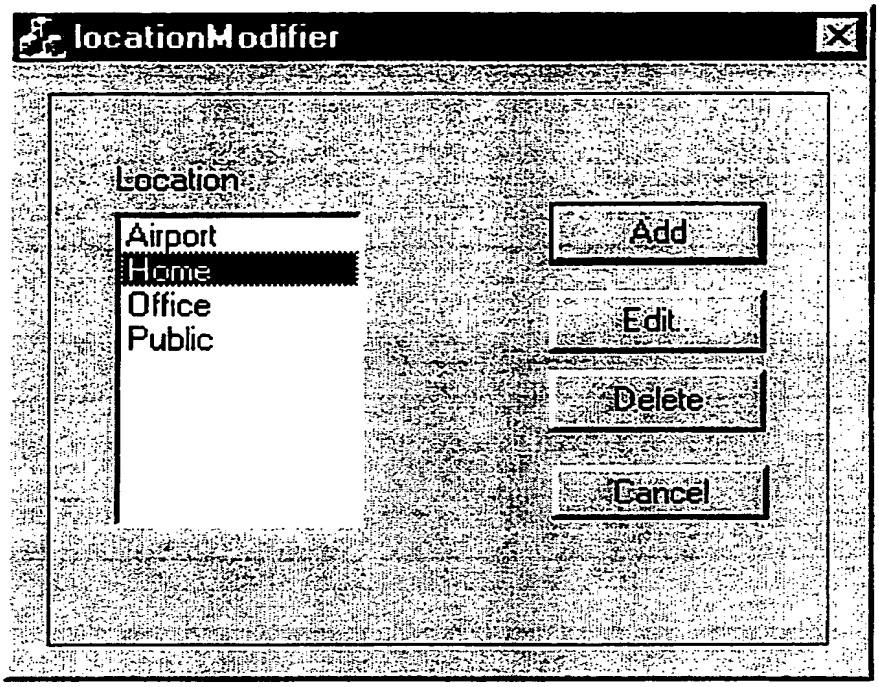
locationModifier
Location:
Airport
Home
Office
Public
Add
Edit
Delete
Cancel

Figure 4

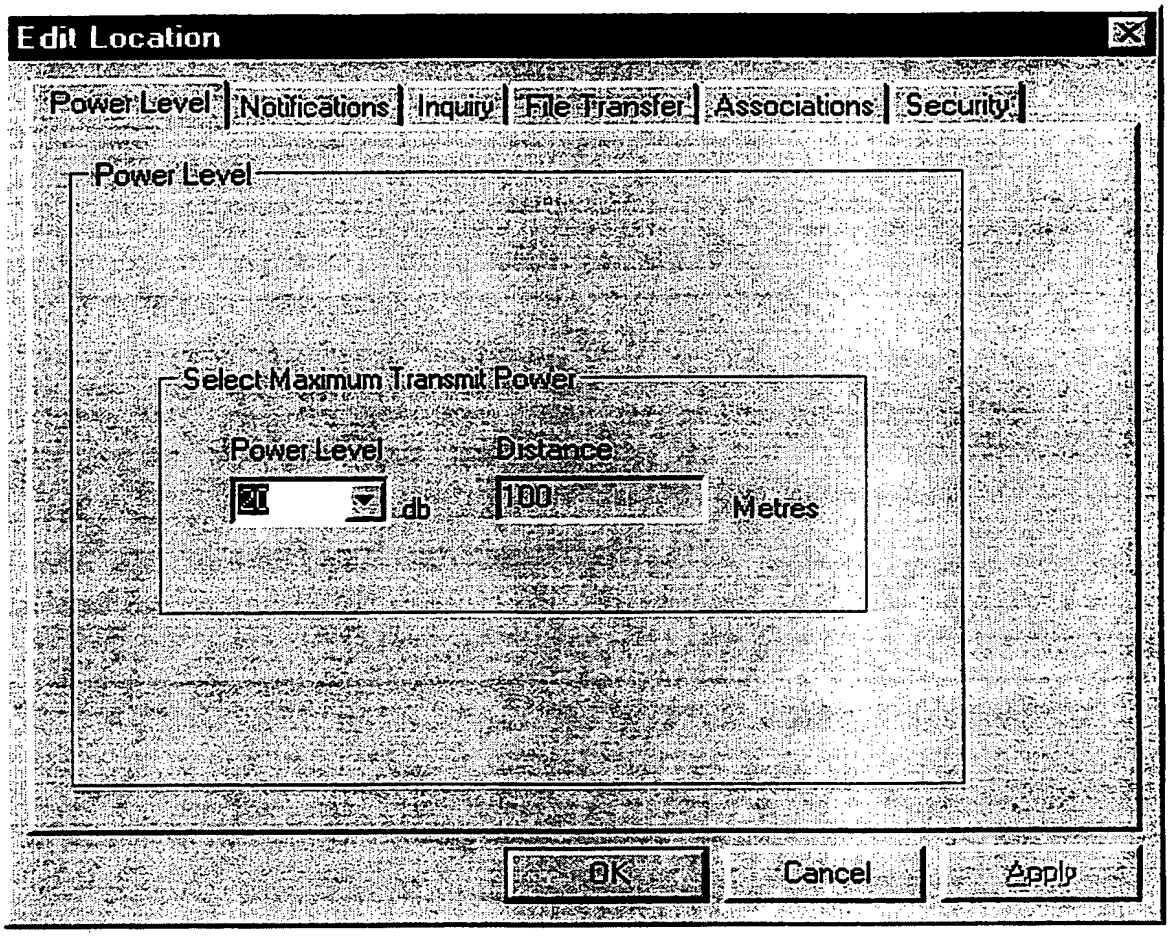
Edit Location
Power Level
Notifications
Inquiry
File Transfer
Associations
Security
Power Level
Select Maximum Transmit Power
Power Level
Distance
20
db
100
Metres
OK
Cancel
Apply

Figure 5

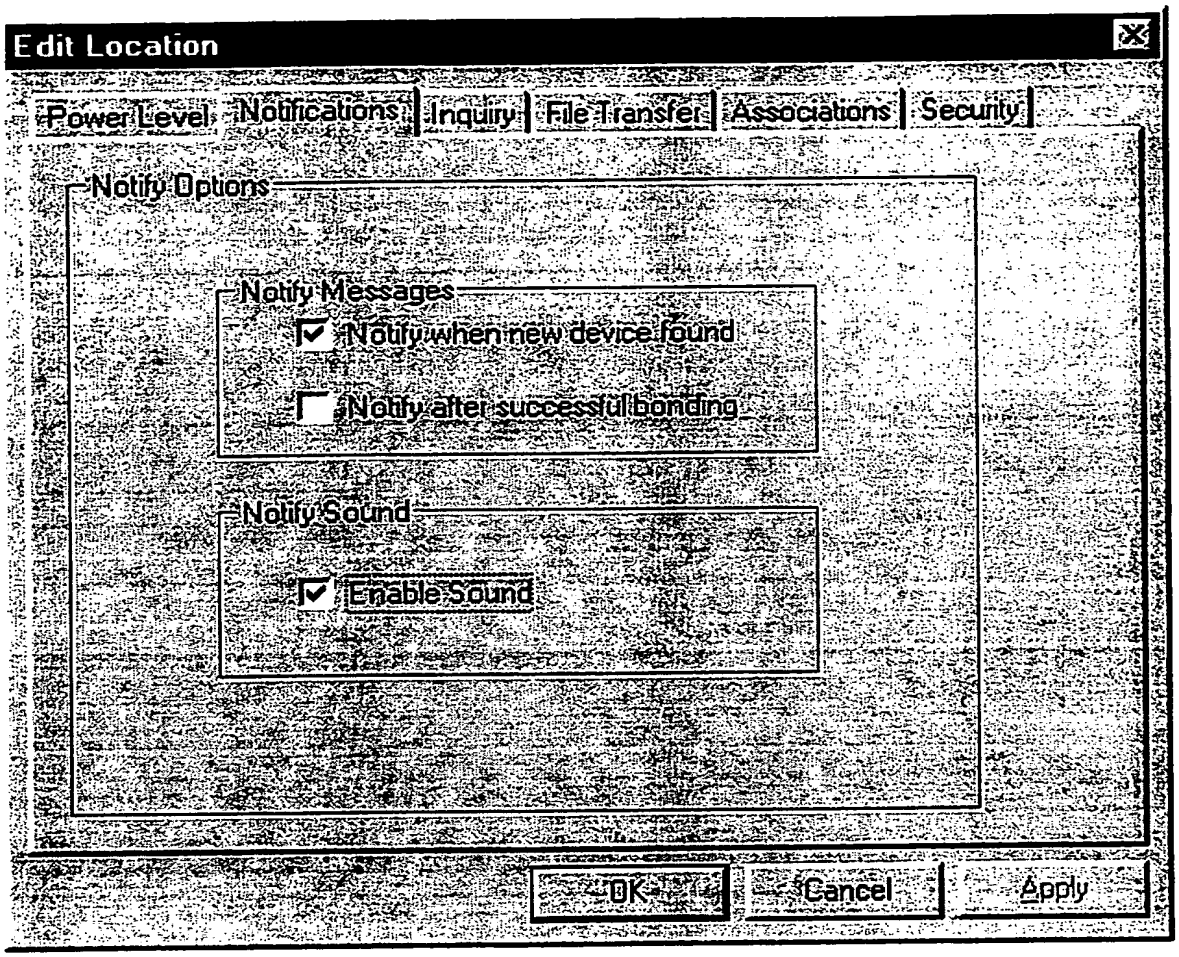
Edit Location
Power Level
Notifications
Inquiry
File Transfer
Associations
Security
Notify Options
Notify Messages
Notify when new device found
Notify after successful bonding
Notify Sound
Enable Sound
OK
Cancel
Apply

Figure 6

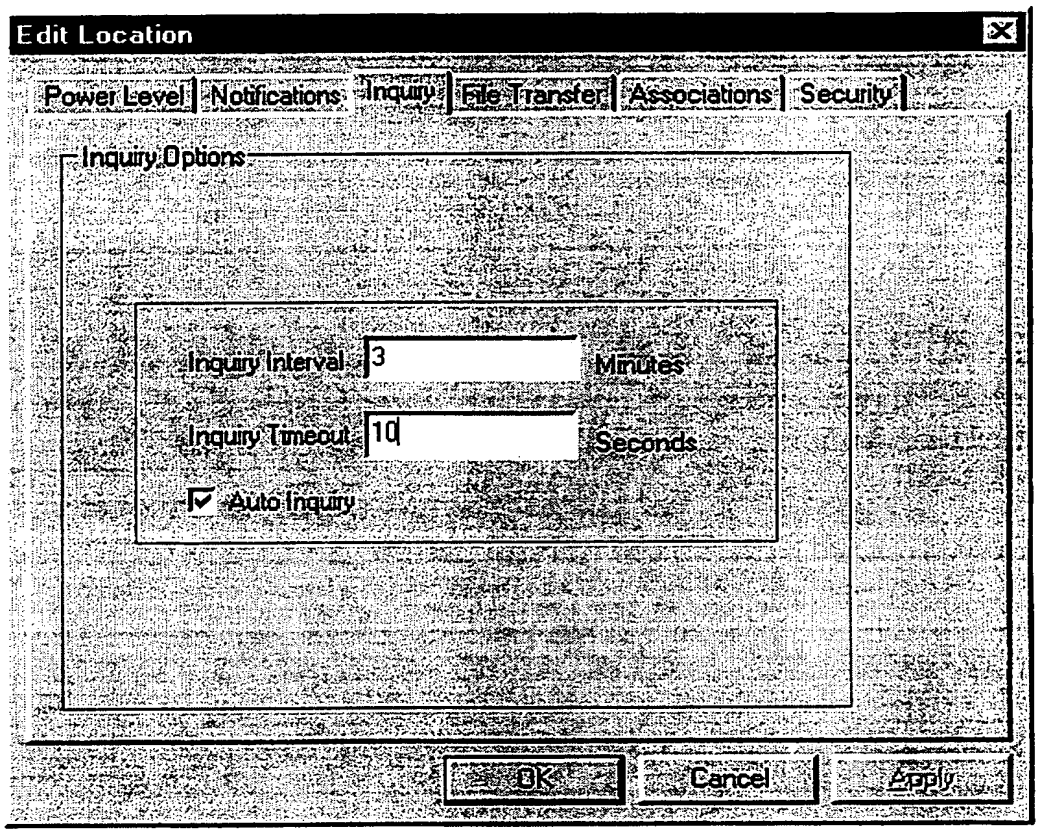
Edit Location
Power Level
Notifications
Inquiry
File Transfer
Associations
Security
Inquiry Options
Inquiry Interval
3
Minutes
Inquiry Timeout
10
Seconds
Auto Inquiry
OK
Cancel
Apply

Figure 7

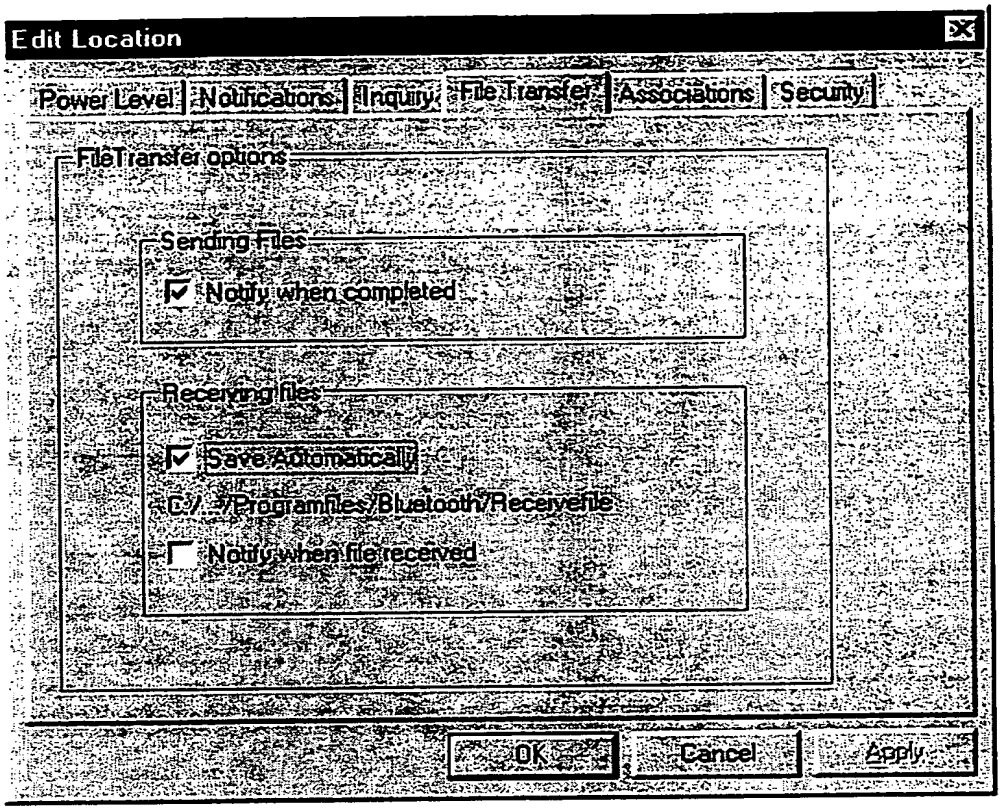
Edit Location
Power Level
Notifications
Inquiry
File Transfer
Associations
Security
File Transfer options
Sending Files
Notify when completed
Receiving files
Save Automatically
C:/.../Programfiles/Bluetooth/Receivefile
Notify when file received
OK
Cancel
Apply

Figure 8

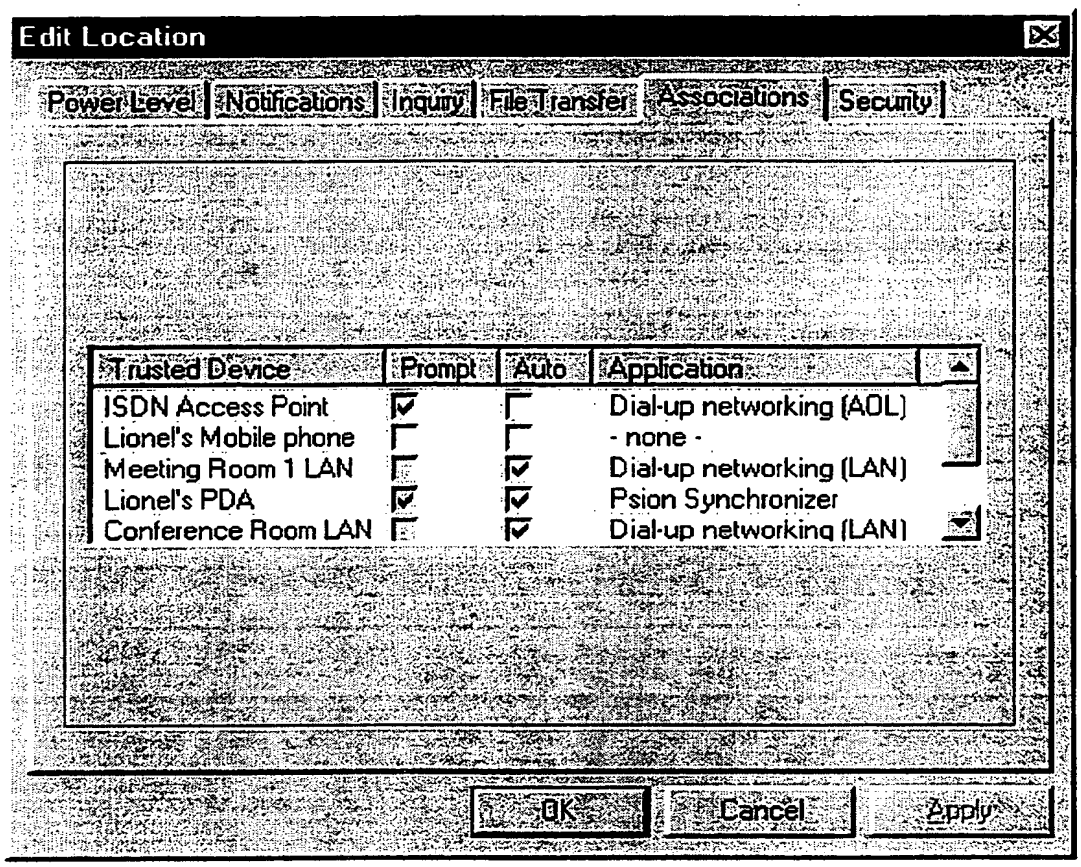
Edit Location
Power Level
Notifications
Inquiry
File Transfer
Associations
Security
Trusted Device
Prompt
Auto
Application
ISDN Access Point
Dial-up networking (AOL)
Lionel's Mobile phone
- none -
Meeting Room 1 LAN
Dial-up networking (LAN)
Lionel's PDA
Psion Synchronizer
Conference Room LAN
Dial-up networking (LAN)
OK
Cancel
Apply

Figure 9

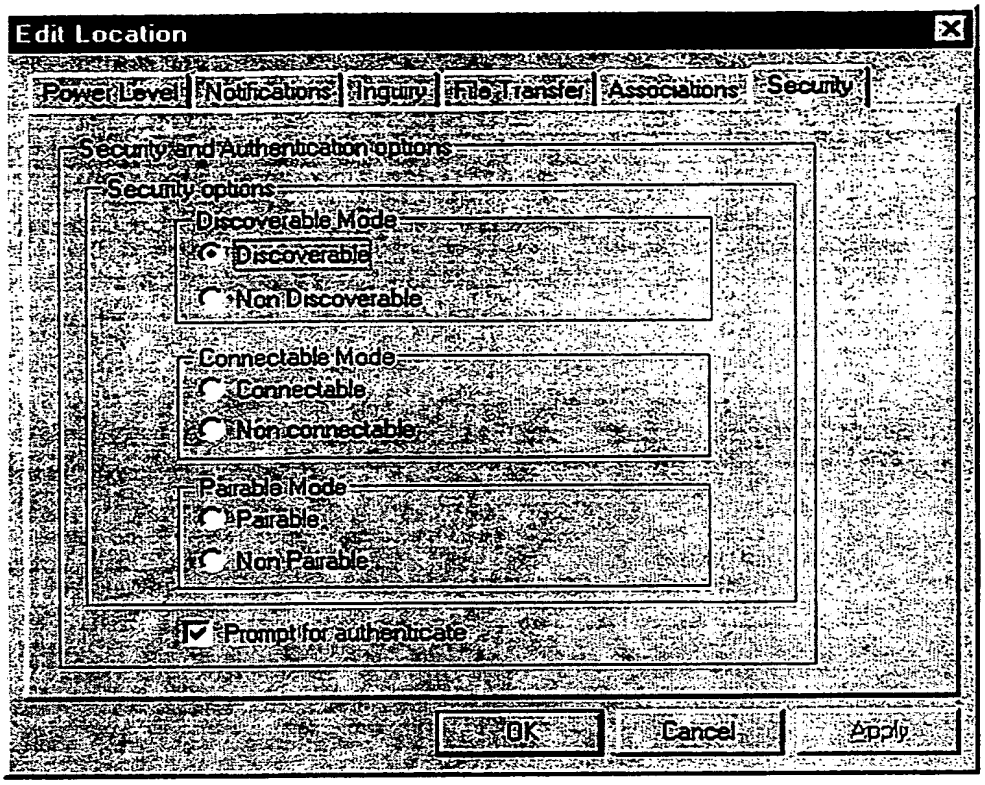
Edit Location
Power Level
Notifications
Inquiry
File Transfer
Associations
Security
Security and Authentication options
Security options
Discoverable Mode
Discoverable
Non Discoverable
Connectable Mode
Connectable
Non connectable
Parable Mode
Parable
Non Parable
Prompt for authenticate
OK
Cancel
Apply

Figure 10

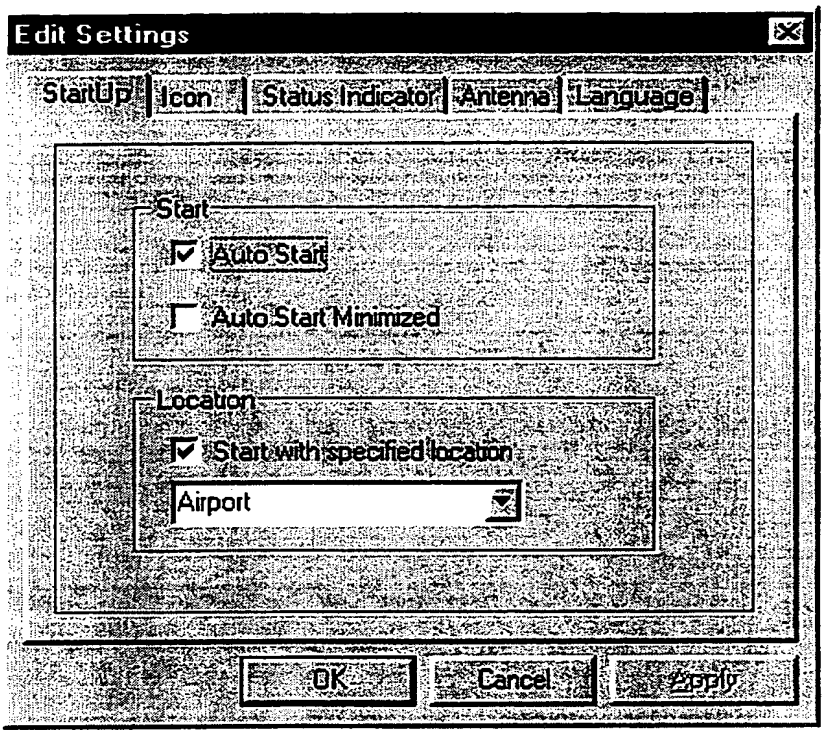
Edit Settings
StartUp
Icon
Status Indicator
Antenna
Language
Start
Auto Start
Auto Start Minimized
Location
Start with specified location
Airport
OK
Cancel
Apply

Figure 11

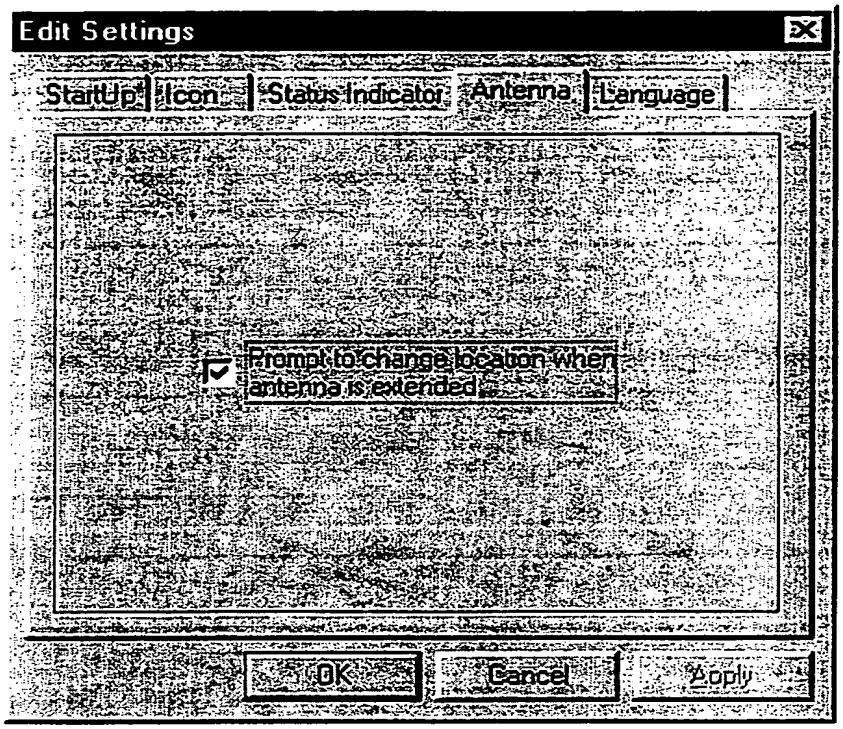
Edit Settings
StartUp
Icon
Status Indicator
Antenna
Language
Prompt to change location when antenna is extended
OK
Cancel
Apply

Figure 12

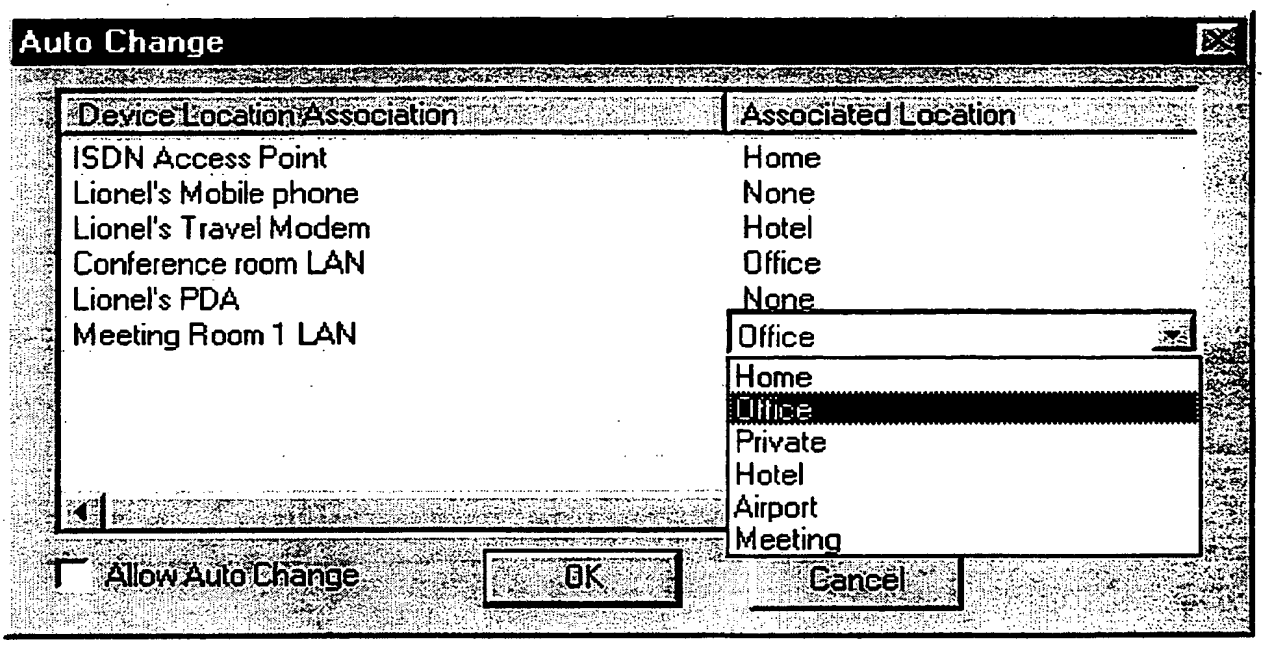
Auto Change
Device Location Association
Associated Location
ISDN Access Point
Home
Lionel's Mobile phone
None
Lionel's Travel Modem
Hotel
Conference room LAN
Office
Lionel's PDA
None
Meeting Room 1 LAN
Office
Home
Office
Private
Hotel
Airport
Meeting
Allow Auto Change
OK
Cancel

Figure 13

A short range radio transceiver device

Field of the Invention

This invention relates to a short range radio transceiver device, such as a Bluetooth® or 802.11b device. It relates also to the controlling program for such a device. The short range radio transceiver device can be any kind of device with communications capabilities based on short range radio. It therefore covers, without limitation, laptop computers, PDAs, smart phones and other kinds of wireless information device.

Description of the Prior Art

Short range radio transceiver devices, exemplified by Bluetooth or 802.11b enabled products, allow wireless communications to take place between different electronic devices. For example, a Bluetooth enabled laptop computer could communicate using Bluetooth short range radio with a modem, enabling wire-free Internet access. Equally, that laptop could communicate with a keyboard, mouse or any other peripheral using Bluetooth radio. The wide-spread adoption of such short range radio communications technology across many different device categories is seen as an important element in pervasive computing. The term 'short range radio transceiver device' used in this specification should be expansively construed to cover any kind of electronic device with communications capabilities utilising short range radio. Such devices, which are usually, but not necessarily, portable devices, include laptop computers, PDAs, smart phones and any other kind of wireless information device, in which one of the components is a short range radio transceiver. The term 'short range radio transceiver device' does not therefore refer to the transceiver per se, but instead to the device into which the transceiver is built.

Bluetooth enabled devices can automatically detect the presence of other Bluetooth enabled devices within range. Hence, a Bluetooth enabled mobile telephone could detect that it is within range of a Bluetooth enabled telephone landline interface when it is used within a building: it could then operate using the landline. Similarly, it can detect when it is not in range of such an interface and can then automatically switch to operating as a cellular mobile telephone.

Another example of Bluetooth functionality follows: if a Bluetooth enabled PDA is brought into range of a Bluetooth enabled host computer in common ownership, then personal information manager applications on both the PDA and the host could be activated and arranged to mutually synchronise automatically.

The operation of Bluetooth and other short range radio devices is defined using different functions, such as the transmit power level, security settings etc. Each of these functions can be set to a different value or range of values; for example, the transmit power level function might be set to a 'high', 'medium' or 'low' value. The term 'parameter' will be used for the values/ranges of values/settings applicable to a given function. A user typically has to manually re-set parameters each time his or her location alters; for example, the user might be using a 'high' power transmit value when located at home, since there might be only a single fixed Bluetooth access point to connect with and a high power setting is needed to ensure connection to it from anywhere within the house. However, when in his office, there might be many such fixed access point, so that the user need only transmit at 'low' power. To re-set the parameters for a function (and possibly many other functions as well) when changing location is not only inconvenient but also easily forgotten.

Summary of the Invention

In a first aspect of the invention, there is a short range radio transceiver device whose operation is defined at least in part by a group of functions, each function being itself defined by one or more parameters;

characterised in that the device stores (a) a first set of such parameters associated with the device being in a first logical location and (b) one or more further sets of such parameters, each associated with the device being in a different logical location;

in which the device is programmed to use data defining whether it is in the first logical location or in one of the different logical locations in order for the applicable set of such parameters to be automatically selected.

The device can obtain the data defining whether it is in the first logical location or in one of the different logical locations in typically one of two different ways. First, the user can manually input a logical location definition into the device; this logical location definition is recognisable to the device as being associated with a given set of parameters for various functions. Secondly, the device can itself detect its logical location by using physical location sensing technology; it can then look-up in a database the applicable parameters associated with its location.

Hence, the present invention envisages in one implementation a short range radio transceiver device, such as a Bluetooth enabled product like a laptop computer, in which the user can manually set a logical location definition, which in turn *automatically* leads to the appropriate parameters being set for some or all of the device functions. This removes the need for the user to manually re-set parameter values each time his or her location alters. Instead, the user simply sets a location definition, and the parameter values appropriate for that location definition pre-stored in the device are called up and applied. The term 'logical location' refers to the name of a set of parameters (or, equivalently, settings). It may in fact be optimised for a given kind of physical location (e.g. an airport etc.), or a specific physical location (e.g. a user's home or car), so that the name is typically the name of a kind of

physical location (or an actual location). Other naming possibilities also exist; these may be similar to the naming schemes used for profile settings in a mobile telephone (e.g. 'Meetings'; 'Private' etc.)

An implementation of the present invention therefore allows a set of the required parameters to be stored in relation to several different environments. The appropriate set is then called up by the user simply defining the logical location of the device by selecting the correct logical location from a list of different logical locations displayed in a menu on a display screen of the device.

For example, the first logical location and the different logical locations could be selected from a list naming several kinds of locations, such as the following: Home; Office; Hotel; Private; Airport; Meeting (or a list covering the same kinds of logical locations but with different names, such as Our House; At Work; etc and/or other kinds of logical locations entirely). The functions could include one or more of the following: Power Level; Notifications; Enquiry; File Transfer; Associations; and Security (or a list covering the same kinds of functions but with different names, and/or other kinds of functions entirely). Hence, a user could set Power Levels to be at a high level when the device is in the Home logical location (where devices to be communicated with may not be that close by) and at a lower level when in the Office logical location; the device is simply told by the user when it is in the Home logical location or the Office logical location and the appropriate parameters for the Power Level function are automatically set.

Similarly, different security levels may be appropriate in different logical locations. A high security level could be a default until the device had been told what location the device was in by a user. In some logical locations, the security level could be such that other devices could communicate with the device only if the devices had established an authenticated link.

As explained above, parameters of operational functions can be automatically altered to be logical location appropriate. The operational functions are not however limited solely to

functions relating to aspects of the short range radio communication function. Instead, the functions can include any application, utility, feature or setting which is logical location dependent. For example, the function could be the dial up networking function and the parameters the various settings needed; when in the office, the device may need to dial out with an initial '9' to get an external line and dial a given external number to reach an Internet Service Provider. Conversely, at home, no '9' may be needed, and a different number for another Internet Service Provider is required. In an implementation of the present invention, the device automatically uses the correct parameters since it is aware of its actual logical location. Hence, when placed into the 'Office' logical location, the device automatically dials out using a '9' prefix.

Another example of a function is printing to a default printer; this will change depending on the device location. In an implementation of the present invention, the device automatically uses the correct printer in any given location which the user has previously associated with the desired printer in that location. For example, when at home, printer ABC1 might be the only available printer, whereas at work, printers ABC2 to ABC20 may be available. Hence, when the user selects logical location 'Home' when at home, printer ABC1 is automatically selected as the default printer and any print requests are sent to that printer.

A software program will typically manage all of the function parameters which are related to the short range radio communication function. This program can be used to control the logical location dependent parameter values of other functions too; alternatively those other functions (e.g. the dial up settings or default printer settings) could be controlled by a different program which obtains the applicable parameters or logical location information from the program which manages the function parameters related to the short range radio communication function.

Preferably, the user is able to manually instruct a controlling program as to the appropriate logical location by selecting options from a menu, such as a pop up menu on a display of the device or the computing platform that contains the device. But, as noted above, the device

may automatically detect whether it is in the first logical location or in one of the different logical locations: hence the user does not have to manually select a logical location from a location menu list displayed on the device. Any change of logical location may instead automatically change the parameters for some or all of the device's functions, without the need for a user to manually instruct the device about the most appropriate logical location to apply. This could be achieved by detecting the presence of other predefined devices that are known by the device to be in a given physical location. For example, if a television with a unique ID 123 is detected by the device and the device knows that the device with ID 123 is in the logical location defined as 'Home', then the device can reasonably assume it is also in the 'Home' logical location since its reception range is limited. Various parameters can then automatically be altered to their 'Home' settings. To use the power level example introduced above, the power level could automatically rise to the value defined by the 'Home' logical location if any device known to be permanently located at home is detected by the device. In a Bluetooth implementation, the device automatically sends out enquiries at defined intervals: when another Bluetooth device is in range, that device responds, giving the enquiring device a unique address identifier. The location and unique address identifier of specified devices can be stored in a table in the enquiring device (e.g. in the controlling program), so that the enquiring device can infer its own logical location by receiving a known unique identifier associated with a device in a fixed physical location.

Similarly in an 802.11b implementation an access point device provides it's unique MAC address when another device is associated with the access point.

In one implementation, when the device is first enabled to transmit, a user will either be given a warning that the device is going to transmit or will be presented with a visual or audio prompt requesting that the location be selected. Nothing will be transmitted or received until the user has responded appropriately to the warning, thereby ensuring that the appropriate parameter set is used before commencing communication. Hence, a pop-up antenna could be used: when the antenna is popped up or positioned or extended for use,

the user could be presented with an on-screen message asking for the location to be specified or selected from a list.

The device may be programmed to use a default set of parameters when it is first enabled to transmit, but before it can actually do so. For example, the most private logical location with the most secure set of parameters may define the default.

In another aspect, there is provided a computer program for controlling a short range radio transceiver device whose performance is defined at least in part by a group of functions, each function being itself defined by one or more parameters; in which the program enables the device to operate as a device defined above. The program can be arranged to auto-start when the device itself is started up.

In a further aspect, there is a Bluetooth transceiver controlled or managed at least in part by a computer program as defined above. The short range radio transceiver device can be implemented in a variety of ways. The transceiver component of it may comprise a transceiver configured on a PCMCIA card; the PCMCIA card can be slotted into a PC laptop computer, personal organiser etc. so that the combination forms a short range radio transceiver device in accordance with the invention. In such an implementation, communications protocol stacks will reside on the PC/personal organiser etc; a computer program for managing the various location dependent parameters of the transceiver, and the associated user interface enabling a user to set the various location dependent parameters, runs on the stack. In another implementation, the transceiver itself is formed in a USB device as opposed to a PCMCIA card format device. In a further implementation, the transceiver is formed as embedded hardware which can be integrated within the device as opposed to being placed in a detachable peripheral such as a PC card or USB device. The embedded hardware could be stand alone hardware e.g. as a separate module, or embedded within a core chip-set of the device or positioned on the same PCB as the core-chip set. In each of the above implementations, the transceiver may be a Bluetooth transceiver.

When a user with a transceiver device, such as a Bluetooth enabled laptop, wishes to dial out using a Bluetooth enabled modem, one conventional approach is for the user to initiate a manual procedure which links the modem to the required logical device on the laptop device. This manual process typically comprises the following steps: (a) the user selects the device to be connected to (i.e. a specific modem) from a list; (b) a service discovery process is initiated and the user selects one or more services/profiles offered by the modem (e.g. if the modem offers both fax and dial-up networking, the user selects the dial-up networking option); (c) once the dial-up connection is established the user now opens/returns to the PC based application which needs an external connection (e.g. a browser or e-mail client). This however can be repetitious and slow for the user.

Similarly when a user with a transceiver device, such as a Bluetooth enabled laptop, wishes to synchronise with a Bluetooth enabled mobile phone, one conventional approach is for the user to initiate a manual procedure which typically comprises the following steps: (a) the user selects the device to be connected to from a list; (b) a service discovery process is initiated and the user selects the appropriate service / profile offered by the device (in this case, serial port profile); (c) once the connection between the mobile phone and a communications port on the laptop device is established the synchronisation application is opened and communication is started using the communications port.

In a final aspect of the invention, there is a short range radio device capable of communicating with remote devices over short range radio; characterised in that the device stores the information (i) needed to establish a connection with the remote devices and (ii) to use the services offered by those devices and can automatically use that information.

For each remote device and associated service the stored information is associated with a logical communications port or logical device needed to communicate with the remote device and the relevant service, such that when the logical communications port or logical device is opened by an application, the stored information is used to automatically initiate

and complete a connection to the service on the remote device. This process involves one or more of the following steps:

(a) enquiry;

(b) paging;

(b) service discovery;

(c) service selection and connection

This is faster and easier for users than the multi-stage manual process and is consistent with the established usage of the Dial Up Networking function within the Windows operating system.

Referring to the example of the Bluetooth enabled laptop synchronising with a Bluetooth enabled mobile phone, the manual process reduces to opening the synchronisation application and starting the synchronisation. The automatic process then starts when the logical port is opened and the communication link is established allowing synchronisation to complete.

The information needed to establish a connection with the remote device comprises at least the following kinds of information:

(a) the remote device address.

The information needed to use the services offered by that device comprises one or more of the following kinds of information:

(a) the names of the services.

(b) a globally unique identifier for the service

The short range radio can be Bluetooth or 802.11b short range radio.

The term 'port' can be a real or virtual/logical port; it can also refer simply to a logical device since in some situations/operating systems no specific port need be pre-associated with a given device. Hence, port selection may involve linking each application with a particular logical device (rather than a specific real port) and an associated communications protocol. For example, if a user wishes to capture video, he simply opens the video application; this causes the video camera device to be paged; when the connection process is completed (and it may not matter which real or virtual port is used for this process) video can be captured.

Brief Description of the Drawings

The invention will be described with reference to the accompanying **Figure 1 – 13**, which are screen shots from a computer program running on a short range radio transceiver device which implements the present invention.

Detailed Description

Figures 1 – 13 are screen shots showing the operation of the Bluetooth Manager™ software from Psion Dacom plc of the United Kingdom. The Bluetooth Manager™ software can run on various kinds of short range radio transceiver devices, such as laptop computers running the Microsoft Windows operating system. It allows a user to enter the values of various parameters which define the performance or operation of the device.

Referring to **Figure 1**, the toolbar running across the top of the screen includes a drop down menu list currently selected as 'Home'. By selecting the window a list can drop down to reveal the names of several different locations. The location names in this example are:

Home
Office

Private
Hotel
Airport
Meeting

If the 'Location' menu is selected, as shown in **Figure 2**, then a menu appears listing the options: Change Location; Edit Location and Auto Change. Selecting the first option, Change Location, causes the dialog window to appear listing all location names, as shown in Figure 3.The user merely has to select the required location name for that location to be selected. As noted above, that causes various parameter values to alter to the parameters previously stored as being appropriate for the selected location. Selecting the second option, Edit Location, causes the dialog of **Figure 4** to be displayed. The currently selected location is shown highlighted; further names of locations can be added using the 'Add' button; a location can be deleted using the 'Delete' button and the dialog window cancelled using the 'Cancel'. When the 'Edit' button shown in **Figure 4** is selected, then the dialog windows shown in **Figure 5 – 10** are displayed. These show the various parameters related to each location definition. The kinds of parameters are shown in the six tabs within the edit Location window, namely:

Power level
Notifications
Enquiry
File Transfer
Associations; and
Security

Additional parameters are possible and can be soft-loaded into the Bluetooth manager program.

Figure 5 shows the Power Level parameter window. The user is able to select the appropriate transmission power level; in this case a 20db level has been selected from a list. Hence, the 'Home' location is associated with a 20db power level; this level is automatically selected whenever the Home location is selected by the User. The 20db power level is the first member of the set of parameters associated with the Home location. The associated effective transmission distance is shown in the Distance box. Alternatively, a user (who may be unfamiliar with the significance of power levels expressed in decibels) may be able to directly select the appropriate transmission distance.

Figure 6 shows the Notification parameters. Various options can be selected using the illustrated check boxes: whether the user should be notified when a new device is found; whether the user should be notified when a new device is successfully bonded to; whether a user should be notified by a sound alert. In this case, notification arises with a sound alert and when a new device is found. This constitutes two further parameters associated with the Home location. Different boxes can be readily checked and the 'OK' button selected to enter different Notification parameters.

Figure 7 shows the Enquiry options. Enquiry options are a Bluetooth feature; an enquiry is a message transmitted from the device to determine if there are any other Bluetooth enabled devices within range. In the present example, Auto-Enquiry has been selected; an automatic enquiry is therefore sent out, with an interval defined by the user as every 3 minutes, with a 10 second Timeout. These are further parameters of the Home location.

Figure 8 shows the File Transfer option parameters. A user can select the following check boxes: notification when a file has been sent; auto-saving of incoming files; notification when files are received. These are further parameters of the Home location.

Figure 9 shows the Association parameters. Association is another conventional function which enables a defined application on the device to be activated when the device is within range of another Bluetooth device. A user can define various Trusted Devices (a Bluetooth

term) and the nature of the Application on the device which is activated. The activation can be selected to be automatic or subject to a user command after a prompt. In the illustrated **Figure 9** case, relating to the Home location, when the device is within range of an ISDN Access Port, then Dial up Networking is automatically activated. Similarly, when the device senses Meeting Room 1 LAN, then Dial Up Networking (LAN) is activated. When the device called Lionel's PDA is sensed, then the Psion Synchronsier application is auto-activated. When the Conference Room LAN is sensed, then the Dial Up Networking (LAN) is again activated. Further Trusted Devices can readily be added to the list using a conventional pop-up box; the relevant applications can be selected again using a conventional pop-up list of available applications.

Figure 10 illustrates the Security parameters. The parameters are one or more of: Discoverable mode; Connectable mode; Pairable mode; Security level; a check box prompt for authentication is also present. The Bluetooth standard defines the Discoverable, Connectable and Pairable modes. In summary, if Discoverable mode is selected, enquires from other Bluetooth devices will be responded to by the device giving its unique address identifier and other relevant information; if it is not selected, then the device will not so respond. If Connectable mode is selected, then the device allows itself to be connected to; if is not selected, then it does not allow other devices to connect to it. If Pairable mode is selected, then the device accepts a request for pairing, which arises when a pair of devices agree to set up a secure link between one another.

Figure 11 shows how Settings can be edited. Settings itself can be accessed from the main menu, shown in Figure 1. The Auto-Start function has been selected: this results in the Bluetooth manager program starting automatically when the device is turned on. The default start-up location has been set to Airport. Typically, the default start up will be associated with high security parameters. Settings is global and not location dependent.

Figure 12 shows an Antenna prompt: this, when selected, automatically causes the user to be asked whether the location has altered whenever the antenna is raised. This again reduces

the dangers of inappropriate parameters being used (for example, a low security mode when in an open environment).

Figure 13 shows the Auto-Change function: this relates the location of various devices with one of the different location parameter sets (i.e. Home, Office, Private, Hotel, Airport, Meeting). The user is able to set up a table in which different devices are associated with a different location; in the illustrated example, the ISDN Access Port is associated with the Home location; Lionel's Mobile Phone is associated with no locations; Lionel's Travel Modem is associated with the Hotel location etc. Hence, if the device locates the ISDN Access Port during its regular enquiries, then it infers that it must be at Home and it automatically uses the parameters related to the Home setting. Likewise, if Lionel's Travel Modem is sensed during its regular enquiries, then it infers that it must be in a Hotel and it automatically uses the parameters related to the Hotel setting.

Claims

1. A short range radio transceiver device whose operation is defined at least in part by a group of functions, each function being itself defined by one or more parameters; characterised in that the device stores (a) a first set of such parameters associated with the device being in a first logical location and (b) one or more further sets of such parameters, each associated with the device being in a different logical location; in which the device is programmed to use data defining whether it is in the first logical location or in one of the different logical locations in order for the applicable set of such parameters to be automatically selected.

2. The device of Claim 1 in which the user is able to manually input a logical location definition into the device which defines whether the device is in the first logical location or one of the different logical locations.

3. The device of Claim 1 or 2 in which the device can automatically detect whether it is in the first logical location or one of the different logical locations.

4. The device of Claim 1 in which the device uses the Bluetooth or 802.11b short range radio communications standards.

5. The device of Claim 3 which is able to determine the logical location depending on a unique signal from a fixed location device.

6. The device of Claim 5 which is either a Bluetooth device and the unique signal is then the Bluetooth device address or a 802.11b device and the unique signal is then the device MAC address.

7. The device of Claim 1 in which the function is the transmit power level and the parameters are one or more of: the maximum power level; the required transmission range.

8. The device of Claim 1 in which the function is user notifications and the parameters are one or more of: whether a user should be notified when a new device is found or bonded to; whether a user should be notified by a sound alert.

9. The device of Claim 1 in which the function is enquiry options and the parameters are one or more of: the enquiry interval; the enquiry timeout and auto enquiry.

10. The device of Claim 1 in which the function is file transfer and the parameters are one or more of: notification when a file has been sent; auto-saving of incoming files; notification when files are received.

11. The device of Claim 1 in which the function is associations and the parameters are one or more of: the name of the device; a prompt to allow an association; auto-association; the application to be associated.

12. The device of Claim 11 in which the parameters alter in different logical locations to enable auto-associating with different applications.

13. The device of Claim 1 in which the function is security and the parameters are one or more of: discoverable mode; connectable mode; pairable mode; security level; prompt for authentication.

14. The device of Claim 13 in which a first security level is automatically used when the device is in the first location and a different security level when the device is in the different location.

15. The device of Claim 1 in which a user can define a start up default logical location.

16. The device of any preceding Claim in which, before the device is enabled to transmit, a user is presented with a visual or audio prompt requesting that the logical location be selected or defined.

17. The device of Claim 16 including an antenna which is retractable into a casing when not in use and extendable from that casing for use, in which the visual or audio prompt occurs when the antenna is extended for use.

18. The device of Claim 1 in which the functions include functions associated with a short range radio communications application,

19. The device of Claim 1 in which the functions relate to an application, utility, feature or setting which is logical location dependent and which is not related to a short range radio communications application.

20. The device of Claim 1 in which the first logical location and other different logical locations are selected from a menu list defining several different kinds of logical locations displayed on a display of the device.

21. A computer program for controlling a short range radio transceiver device whose performance is defined at least in part by a group of functions, each function being itself defined by one or more parameters; in which the program enables the device to operate as a device claimed in any preceding device Claim 1 – 20.

22. The program of Claim 21 in which the program can control the logical location dependent parameters of an application, utility or function directly.

23. The program of Claim 21 or 22 in which the program can control the logical location dependent parameters of an application, utility or function indirectly.

24. The program of Claim 23 in which the program provides applicable parameters or logical location information to another program, which in turn directly controls the logical location dependent parameters of the application, utility or function

25. The program of Claim 21, being is embedded in or otherwise included in a short range radio transceiver in the device.

26 A Bluetooth or 802.11b transceiver controlled or managed at least in part by a computer program as defined in Claim 21 – 25..

27. A short range radio device capable of communicating with at least one remote device over short range radio; characterised in that the device stores the information (i) needed to establish a connection with the or each remote device and (ii) to use the services offered by the or each device and can automatically use that information.

28. The device of Claim 27 programmed such that, for the or each remote device and associated service the stored information is associated with a logical communications port or logical device needed to communicate with the or each remote device and the relevant service, such that when the logical communications port or logical device is opened by an application, the stored information is used to automatically initiate and complete a connection to the service on the or each remote device.

29. The device of Claim 28 which uses that information automatically to initiate and complete one or more of the following steps:

(a) enquiry;

(b) paging;

(b) service discovery;

(c) service selection and connection.

30. The device of Claim 29 in which the information needed to establish a connection with the remote device comprises at least the following kinds of information:

(a) the remote device address.

31. The device of Claim 30 in which the logical port on the device to be used by the remote device is associated with the remote device.

32. The device of Claim 28 in which the information needed to use the services offered by that device comprises one or more of the following kinds of information:

(a) the names of the services;

(b) a globally unique identifier for the service

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Application No: GB 0107930.0
Claims searched: 1-26

Examiner: Robert Macdonald
Date of search: 1 June 2001

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.S): H4L(LRAX, LDGX, LDPB, LDDDM, LED, LEF)

Int Cl (Ed.7): H04Q(7/22, 7/28, 7/32, 7/38, 11/04)

Other: ONLINE: WPI, PAJ, EPODOC, TXTUS1, TXTUS2, TXTEP1, TXTWO1, TXTGB1,

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
X	GB 2300787 A	(NEC CORPORATION) See whole document	1, at least
X,E	WO 00/74424 A1	(NOKIA) See whole document	1,3-6, and 19
X,E	WO 00/51293 A	(ERICSSON) See whole document	1,3,4, and 7

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

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INVESTOR IN PEOPLE

Application No: GB 0107930.0
Claims searched: 27-32

Examiner: Robert Macdonald
Date of search: 1 June 2001

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Further Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.S): H4L(LDGX, LRAX, LRPRD, LED, LECY, LECCX, LEUX)

Int Cl (Ed.7): H04L(29/06); H04Q(7/32, 11/04)

Other: ONLINE: WPI, PAJ, EPODOC, TXTUS1, TXTUS2, TXTEP1, TXTWO1, TXTGB1,

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
X,E	WO 0028403	(NOKIA MOBILE PHONES LTD) See whole document	27
X	WO 9707642	(MOTOROLA) See whole document.	27
X	"The Bluetooth radio system" Haartsen, J.C. IEEE Personal Communications , Volume: 7 Issue: 1 , Feb. 2000 Page(s): 28 -36		27

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
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